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EXAMINER	
CHANG, AUDREY Y	
ART UNIT	**PAPER NUMBER**
2872	

DATE MAILED: 07/01/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/724,551	RANALLI, ELISEO R.	
	Examiner	Art Unit	
	Audrey Y. Chang	2872	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *05 May 2005*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *11-18* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *11-18* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Remark

- This Office Action is in response to applicant's amendment filed on May 5, 200, which has been entered into the file.
- By this amendment, the applicant has canceled claims 1-10 and has newly added claims 11-18.
- Claims 11-18 remain pending in this application.
- The rejections of claims 1-10 under 35 USC 112, first paragraph, set forth in the previous Office Action are withdrawn in response to applicant's amendment.

Response to Amendment

1. **The amendment filed on May 5, 2005** is objected to under 35 U.S.C. 132(a) because it introduces new matter into the disclosure. 35 U.S.C. 132(a) states that no amendment shall introduce new matter into the disclosure of the invention. The added material which is not supported by the original disclosure is as follows: **the newly added claims 11, 12 and 13**, recite the following phrases "a *non-periodic* echelle structure", "the transfer function being *not achieved* by means of a periodic echelle structure", "a plurality of contiguous reflective facets *unequally spaced* along *any dimension* and of *unequal width*" that **are not supported** by the specification. The specification and the original claims recite a "*quasi*-periodic echelle grating structure" that is *completely different* from a *non-periodic* echelle. The specification also does not teach that the facets are unequally spaced not to mention to be unequally spaced along "any dimension".

Applicant is required to cancel the new matter in the reply to this Office Action.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

3. **Claims 11-18 are rejected under 35 U.S.C. 112, first paragraph**, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

The reasons for rejection based on newly added matters are set forth in the paragraph above.

4. **Claims 11-18 are rejected under 35 U.S.C. 112, first paragraph**, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention.

The specification and the claims **fail** to teach how could the plurality of contiguous reflective facets is capable of "unequally spaced along *any dimension*", wherein the *any* dimension can be either on two-dimensional plane or in three-dimensional volume space.

The specification and the claims also fail to teach how could the "entrance and exit apertures" be "*spatially single mode*". An aperture is just an opening. It is not clear how could these "openings" be "single mode". Single mode of what is being achieved.

The specification and the claims also fail to teach how could both the input beam and the output beam both ***incident*** *on each facet and be* ***intersecting*** *over an area encompassing all the reflective facets.* All the Figures in the specification teaches that the output beam are resulted of the diffraction action of the echelle structure and being reflected away from the structure. The output beam cannot be incident on the structure.

The specification and the claims **fail** to teach how could the echelle structure is capable of being "generalized" to geometries other than collimated input and output beams.

Claim Objections

5. Claims 11-18 are objected to because of the following informalities:

(1). The phrase "single mode input and output apertures" **recited in claims 11, 12 and 13** is confusing and indefinite since it is not clear what is considered to be the "single mode" for "apertures" which are really just "a plurality of *physical openings*". Single mode is a term reserved in the art for describing the laser light or laser light beams conveyed by waveguide. An aperture or a plurality of apertures does not have either single mode or multimode.

(2). The phrase "entrance and exit apertures which are spatially single-mode over the prescribed wavelength range of operation" **recited in claim 12** is completely confusing and indefinite since it is not clear if this referred to a light source arrangement or just a bunch of physical openings.

(3). The phrase "a means of collimating the single mode entrance and exit apertures such that input beam, ... is incident upon each facet ... and the output beam, resulting from the collimation of the single-mode exit aperture, is also incident upon each facet ... input and output beams intersecting over an area ..." **recited in claim 12** is *completely wrong, confusing and indefinite*. This phrase is also not supported by the specification of the instant application. It is really not clear what are these input and output beams. The scopes of the claim therefore are not definite.

(4). The phrase "an *appropriate* sampling interval T seconds" recited in claim 13 is confusing and indefinite since it is not clear what is considered to be "appropriate" here. The phrase "selecting an appropriate sampling interval T seconds ... over which a desired narrow-band temporal optical transfer function H (v) is to be uniquely specified" recited in claim 13 is confusing and indefinite since this phrase

since to be going a circle since without the H (v) function being specified the sampling interval seems can be selected arbitrarily and any function once being specified is uniquely specified. This phrase therefore is not making any sense as far as the limitations concerns.

(5). The steps (c) and (d) recited in claim 13 are not definite since the following symbols "H(v), h_m, "vc", and "m" have not been defied or given physical meanings. The equation recited therein therefore has no meanings.

Appropriate correction is required.

Claim Rejections - 35 USC § 102

6. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

7. **Claims 11 and 12 are rejected under 35 U.S.C. 102(b) as being anticipated by the patent issued to Oishi et al (PN. 4, 886,341).**

Oishi et al teaches an *echellette* type *diffraction grating* (30) having a plurality of *grooves* (32a and 32b, Figures 3 and 4), that serve as the plurality of *contiguous reflective facets*. Oishi et al teaches that he reflective facets or the grooves are arranged as *non-periodic* since there is not a singe period can be defined among all of the facets. The facets are also spaced unequally along the transverse dimension of the grating with unequal width, (please see columns 3-5).

It is implicitly true that the echellette type diffraction grating has an *inherent* optical transfer function, (which describes the optical action of the diffraction grating acts upon the incident light), and it is implicitly true that the optical transfer function is a *complex* function of frequency with amplitude and phase. One skilled in the art would know that Hz, or hertz, is the standard unit for frequency.

With regard to claim 12, Oishi et al teaches that the echellette type diffraction grating can be applied in a *spectrophotometer*, (please see Figure 2), which serves as the *optical device*, having *entrance aperture* (14) and *exit aperture* (20). The optical device further comprises a *collimator* (15) for *collimating* the incident light from the entrance aperture so that the collimated input light incident on the echellette type diffraction grating (24) at a *common angle* and the echellette type diffraction grating creates the *collimated output beams* that intersecting the input beams. It is implicitly true from the optical reversibility, the output beams can be traced back from the *exit aperture* (20) through the *collimator* (19) back "incident" on the echellette diffraction grating at a common angle. The intersection of the input and output beams is over an area encompassing all of the reflective facets of the echellette diffraction grating, (please see Figure 2).

This reference has therefore anticipated the claims

Claim Rejections - 35 USC § 103

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

9. Claims 13-14 are rejected under 35 U.S.C. 103(a) as being unpatentable over the patent issued to Oishi et al.

Oishi et al teaches an *echellette* type *diffraction grating* (30) having a plurality of *grooves* (32a and 32b, Figures 3 and 4), that serve as the plurality of *contiguous reflective facets*. Oishi et al teaches that he reflective facets or the grooves are arranged as *non-periodic* since there is not a singe period can be defined among all of the facets. The facets are also spaced unequally along the transverse dimension of the grating with unequal width, (please see columns 3-5).

It is implicitly true that the echellette type diffraction grating has an *inherent* optical transfer function, (which describes the optical action of the diffraction grating acts upon the incident light), and it is implicitly true that the optical transfer function is a *complex* function of frequency with amplitude and phase. One skilled in the art would know that Hz, or hertz, is the standard unit for frequency. It is also implicitly true that one can find a sampling interval T seconds such that the optical transfer function is *uniquely* defined. The input light beam has to illuminate on a number M of the echelle facets and it is implicitly true that the number of the facets being illuminated must be greater than the inverse of the multiple of the minimum resolvable spectral feature W (or resolution) and the time interval T, since the dimension of the number of the facets being illuminated really is comparable to the wavelength separation between consecutive waves. And since it is known in the art that the optical transfer function for the echellette diffraction grating is a measure of how the input beam being acted upon by the grating, the reflected intensity or the amplitude of the input beam by each facet therefore has to be related to the optical transfer function, and it is implicitly true that reflected intensities of the input beam by all of the facets really defines the optical transfer function. It is therefore within the general skill of a worker in the art to find the optical transfer function H(v) that satisfies the equation stated in the claim.

This reference however does not teach *explicitly* that each of the facets is determined in the iteration steps stated in the claims. But as indicated in the paragraph above, since the mathematical relationship between the intensity of the reflected input beam by each facet and the optical transfer function does inherently present, such steps of determination is either implicitly met or obvious modification to one skilled in the art, since after all Oishi et al does teach a echellette diffraction grating with a plurality of reflective facets. Certain method steps for determining the reflective facets have to be implicitly included.

10. Claims 15 and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over the patent issued to Oishi et al (PN. 4,886,341) in view of the patent issued to Sappey et al (PN. 6,647,182).

The echellette type diffraction grating taught by **Oishi** et al as described for claim 11 above has met all the limitations of the claims. Oishi et al does not teach explicitly that the diffraction grating is formed by a master and the facets are coated to increase the reflectivity. **Sappey** et al in the same field of endeavor teaches that a typical way of forming echellette diffraction grating is by using master to mold the grating profile and to coat the facets with *highly* reflective material, (please see column 10, lines 34-39). It would then have been obvious to one skilled in the art to apply the teachings of Sappey et al to make the reflective echellette type diffraction grating of Oishi et al for the benefit of making the grating with master production method and to increase the reflectivity therefore efficiency of the grating by using highly reflective coating.

11. Claims 17-18 are rejected under 35 U.S.C. 103(a) as being unpatentable over the patent issued to Oishi et al as applied to claim 13 above, and further in view of the patent issued to Sappey et al.

The echellette type diffraction grating taught by **Oishi** et al as described for claim 13 above has met all the limitations of the claims. Oishi et al teaches that the diffraction grating can be used in an optical device with entrance aperture and exit aperture but it does not teach explicitly that the apertures are provided by single mode fiber and singe mode slab waveguide. Sappey et al in the same field of endeavor teaches essentially a wavelength divisional multiplexing system that is based on the dispersion property of an echelle diffraction grating wherein a waveguide with single mode optical fibers (14 and 16) are used as the input and output ports for providing input light and for receiving output light. It would then have been obvious to one skilled in the art to use the waveguide structure as an alternative means for the light entrances and exit apertures for the benefit of more efficiently transporting the light beam.

Response to Arguments

12. Applicant's arguments with respect to **newly submitted** claims 11-18 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

13. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Audrey Y. Chang whose telephone number is 571-272-2309. The examiner can normally be reached on Monday-Friday (8:00-4:30), alternative Mondays off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Drew Dunn can be reached on 571-272-2312. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Audrey Y. Chang, Ph.D.
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